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**U. S. Department of Agriculture
Bureau of Agricultural Economics**

**Handbook of
United States Grades
for
Milled Rice**



**As Revised
Effective February 1, 1927**



**Washington
Government Printing Office**

1927



U. S. Department of Agriculture
Bureau of Agricultural Economics

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United States Grades
for
Milled Rice

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COMPILED BY
E. G. BOERNER
In charge, Grain Investigations
W. D. SMITH
In charge, Rice Investigations
R. M. GEHL,
Rice Investigations, Grain Division



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UNITED STATES GRADES FOR MILLED RICE

For the purposes of the United States grades for milled rice:

Milled rice.—Milled rice shall be whole or broken kernels of rice grown in continental United States, from which the hulls and practically all of the germs and bran layers have been removed, which may be either coated or uncoated, and which does not contain more than 10 per cent of cereal grains, including paddy grains, seeds, or other foreign material, either singly or in any combination.

NOTE.—Milled rice for the purposes of the grades is divided into classes and subclasses as follows: Class I, Honduras Milled Rice; Class II, Edith Milled Rice; Class III, Fortuna Milled Rice; Class IV, Carolina Milled Rice; Class V, Lady Wright Milled Rice; Class VI, Blue Rose Milled Rice; Class VII, Early Prolific Milled Rice; Class VIII, Japan Milled Rice, divided into subclasses (a) Japan Milled Rice and (b) California Japan Milled Rice; Class IX, Second Head Milled Rice; Class X, Screenings Milled Rice, divided into subclasses (a) Screenings Milled Rice and (b) California Japan Screenings Milled Rice; Class XI, Brewers Milled Rice, divided into subclasses (a) Brewers Milled Rice and (b) California Japan Brewers Milled Rice; and Mixed Milled Rice.

HONDURAS MILLED RICE (CLASS I)

This class shall include the rices known commercially as Honduras and Mortgage Lifter, which contain more than 25 per cent of whole kernels, and may include not more than 10 per cent of whole kernels of rice of any other class or classes.

EDITH MILLED RICE (CLASS II)

This class shall include the rice known commercially as Edith, which contains more than 25 per cent of whole kernels, and may include not more than 10 per cent of whole kernels of rice of any other class or classes.

FORTUNA MILLED RICE (CLASS III)

This class shall include the rice known commercially as Fortuna, which contains more than 25 per cent of whole kernels, and may include not more than 10 per cent of whole kernels of rice of any other class or classes.

CAROLINA MILLED RICE (CLASS IV)

This class shall include the rices known commercially as Carolina and Storm Proof, which contains more than 25 per cent of whole kernels, and may include not more than 10 per cent of whole kernels of rice of any other class or classes.

LADY WRIGHT MILLED RICE (CLASS V)

This class shall include the rice known commercially as Lady Wright, which contains more than 25 per cent of whole kernels, and may include not more than 10 per cent of whole kernels of rice of any other class or classes.

Grade requirements for the classes Honduras, Edith, Fortuna, Carolina, and Lady Wright Milled Rice

Grade	Maximum limits of—						
	Cereal grains, seeds, and heat damage (number in 500 grams)		Red. rice and damage other than heat (singly or combined)	Chalky kernels	Broken kernels		Other rices
	Total	Heat damage and seeds (singly or combined)			Total	Through No. 6 sieve	
Extra Fancy (U. S. No. 1)-----	No. 3	No. 1	P. ct. 0.5	P. ct. 1.0	P. ct. 10	P. ct. 0.3	P. ct. 1
Fancy (U. S. No. 2)---	7	4	1.5	1.5	15	.5	2
Extra Choice (U. S. No. 3)-----	12	7	2.0	2.0	20	.7	4
Choice (U. S. No. 4)---	18	10	2.5	3.0	25	1.0	6
Medium (U. S. No. 5)---	40	25	6.0	6.0	35	2.0	10

Sample grade: Sample grade shall be milled rice of the classes Honduras, or Edith, or Fortuna, or Carolina, or Lady Wright, respectively, which does not come within the requirements of any of the grades from Extra Fancy (U. S. No. 1) to Medium (U. S. No. 5), inclusive, or which has any commercially objectionable foreign odor, or is musty, or sour, or is heating, or hot, or is of a badly damaged or extremely red appearance, or is otherwise of distinctly low quality, or contains more than 0.1 per cent of foreign material excepting paddy grains, other cereal grains, and seeds.

The percentage of moisture in the grades Extra Fancy (U. S. No. 1), Fancy (U. S. No. 2), Extra Choice (U. S. No. 3), Choice (U. S. No. 4), and Medium (U. S. No. 5) shall not exceed 14.5.

Color and general appearance.—Rice of the grade Extra Fancy (U. S. No. 1) shall be white or creamy and shall be well milled. Rice of the grade Fancy (U. S. No. 2) shall be white, creamy, or grayish, and shall be well milled. Rice of the grade Extra Choice (U. S. No. 3) shall be white, creamy, or grayish, and shall be reasonably well milled. Rice of the grade Choice (U. S. No. 4) shall be white, creamy, or grayish, and may be slightly rosy, and shall be reasonably well milled. Rice of the grade Medium (U. S. No. 5) may be of slightly damaged or red appearance.

BLUE ROSE MILLED RICE (CLASS VI)

This class shall include the rices known commercially as Blue Rose, Greater Blue Rose, and Improved Blue Rose, which contain more than 25 per cent of whole kernels and may include not more than 10 per cent of whole kernels of rice of any other class or classes.

EARLY PROLIFIC MILLED RICE (CLASS VII)

This class shall include the rice known commercially as Early Prolific, which contains more than 25 per cent of whole kernels and may include more than 10 per cent of whole kernels of rice of any other class or classes.

Grade requirements for the classes Blue Rose and Early Prolific Milled Rice

Grade	Maximum limits of—						
	Cereal grains, seeds, and heat damage (number in 500 grams)		Red rice and damage other than heat (singly or combined)	Chalky kernels	Broken kernels		Other rices
	Total	Heat damage and seeds (singly or combined)			Total	Through No. 6 sieve	
Extra Fancy (U. S. No. 1)-----	No. 3	No. 1	P. ct. 0.5	P. ct. 1.0	P. ct. 5	P. ct. 0.3	P. ct. 1
Fancy (U. S. No. 2)---	7	4	1.5	1.5	10	0.5	2
Extra Choice (U. S. No. 3)-----	12	7	2.0	2.0	15	0.7	4
Choice (U. S. No. 4)---	18	10	2.5	3.0	20	1.0	6
Medium (U. S. No. 5)	40	25	6.0	6.0	35	2.0	10

Sample grade: Sample grade shall be milled rice of the classes Blue Rose or Early Prolific, respectively, which does not come within the requirements of any of the grades from Extra Fancy (U. S. No. 1) to Medium (U. S. No. 5), inclusive, or which has any commercially objectionable foreign odor, or is musty, or sour, or is heating, or hot, or is of a badly damaged or extremely red appearance, or is otherwise of distinctly low quality, or contains more than 0.1 per cent of foreign material, excepting paddy grains, other cereal grains, and seeds.

The percentage of moisture in the grades Extra Fancy (U. S. No. 1), Fancy (U. S. No. 2), Extra Choice (U. S. No. 3), Choice (U. S. No. 4), and Medium (U. S. No. 5) shall not exceed 14.5.

Color and general appearance.—Rice of the grade Extra Fancy (U. S. No. 1) shall be white or creamy and shall be well milled. Rice of the grade Fancy (U. S. No. 2) shall be white, creamy, or grayish, and shall be well milled. Rice of the grade Extra Choice (U. S. No. 3) shall be white, creamy, or grayish, and shall be reasonably well milled. Rice of the grade Choice (U. S. No. 4) shall be white, creamy, or grayish, and may be slightly rosy, and shall be reasonably well milled. Rice of the grade Medium (U. S. No. 5) may be of slightly damaged or red appearance.

JAPAN MILLED RICE (CLASS VIII)

This class shall include the rices known commercially as Japan, which contain more than 25 per cent of whole kernels, and may include not more than 10 per cent of whole kernels of rice of any other class or classes. This class shall be divided into two subclasses: (a) Japan Milled Rice and (b) California Japan Milled Rice.

SUBCLASS (A) JAPAN MILLED RICE

This subclass shall include all rices known commercially as Japan possessing the characteristics of rice of this class as grown east of the Rocky Mountains.

Grade requirements for the subclass Japan Milled Rice

Grade	Maximum limits of—						
	Cereal grains, seeds, and heat damage (number in 500 grams)		Red rice and damage other than heat (singly or combined)	Chalky kernels	Broken kernels		Other rices
	Total	Heat damage and seeds (singly or combined)			Total	Through No. 6 sieve	
Extra Fancy (U. S. No. 1)-----	No. 3	No. 1	P. ct. 0.5	P. ct. 2.0	P. ct. 5	P. ct. 0.3	P. ct. 1
Fancy (U. S. No. 2)---	7	4	1.5	4.0	10	.5	2
Extra Choice (U. S. No. 3)-----	12	7	2.0	6.0	15	.7	4
Choice (U. S. No. 4)---	18	10	2.5	8.0	20	1.0	6
Medium (U. S. No. 5)---	40	25	6.0	10.0	35	2.0	10

Sample grade: Sample grade shall be milled rice of the subclass Japan Milled Rice, respectively, which does not come within the requirements of any of the grades from Extra Fancy (U. S. No. 1) to Medium (U. S. No. 5), inclusive, or which has any commercially objectionable foreign odor, or is musty, or sour, or is heating, or hot, or is of a badly damaged or extremely red appearance, or is otherwise of distinctly low quality, or contains more than 0.1 per cent of foreign material excepting paddy grains, other cereal grains, and seeds.

The percentage of moisture in the grades Extra Fancy (U. S. No. 1), Fancy (U. S. No. 2), Extra Choice (U. S. No. 3), Choice (U. S. No. 4), and Medium (U. S. No. 5) shall not exceed 14.5.

Color and general appearance.—Rice of the grade Extra Fancy (U. S. No. 1) shall be white or creamy and shall be well milled. Rice of the grade Fancy (U. S. No. 2) shall be white, creamy, or grayish, and shall be well milled. Rice of the grade Extra Choice (U. S. No. 3) shall be white, creamy, or grayish, and shall be reasonably well milled. Rice of the grade Choice (U. S. No. 4) shall be white, creamy, or grayish, and may be slightly rosy, and shall be reasonably well milled. Rice of the grade Medium (U. S. No. 5) may be of slightly damaged or red appearance.

SUBCLASS (B) CALIFORNIA JAPAN MILLED RICE

This subclass shall include all rices known commercially as Japan possessing the characteristics of rice of this class as grown west of the Great Plains area of the United States.

*Grade requirements for the subclass (b) California
Japan Milled Rice*

Grade	Maximum limits of—						
	Cereal grains, seeds, and heat damage (number in 500 grams)		Red rice, and damage other than heat (singly or combined)	Chalky kernels	Broken kernels		Other rices
	Total	Heat damage			Total	Through No. 6 sieve	
¹ Extra Fancy (U. S. No. 1)-----	No. 3	No. 0	P. ct. 0.2	P. ct. 2.0	P. ct. 5	P. ct. 0.3	P. ct. 0.2
Fancy (U. S. No. 2)---	7	2	.5	4.0	10	.5	.4
Extra choice (U. S. No. 3)-----	12	3	1.0	6.0	15	.7	1.0
Choice (U. S. No. 4)---	18	5	1.5	8.0	20	1.0	3.0
Medium (U. S. No. 5)	25	7	2.0	10.0	25	2.0	5.0

Sample grade: Sample grade shall be milled rice of the subclass California Japan Milled Rice, which does not come within the requirements for any of the grades from Extra Fancy (U. S. No. 1) to Medium (U. S. No. 5), inclusive, or which has any commercially objectionable foreign odor, or is musty, or sour, or is heating, or hot, or is of a badly damaged or extremely red appearance, or is otherwise of distinctly low quality, or contains more than 0.1 per cent of foreign material excepting paddy grains, other cereal grains, and seeds.

The percentage of moisture in the grades Extra Fancy (U. S. No. 1), Fancy (U. S. No. 2), Extra Choice (U. S. No. 3), Choice (U. S. No. 4), and Medium (U. S. No. 5) shall not exceed 14.5.

Color and general appearance.—Rice of the grade Extra Fancy (U. S. No. 1) shall be white or creamy and shall be well milled. Rice of the grade Fancy (U. S. No. 2) shall be white, creamy, or grayish, and shall be well milled. Rice of the grade Extra Choice (U. S. No. 3) shall be white, creamy, or grayish, and shall be reasonably well milled. Rice of the grade Choice (U. S. No. 4) shall be white, creamy, or grayish, and may be slightly rosy, and shall be reasonably well milled. Rice of the grade Medium (U. S. No. 5) may be of slightly damaged or red appearance.

¹ The grade Extra Fancy shall contain no cereal grains other than paddy grains and may contain not more than one mud lump.

SECOND HEAD MILLED RICE (CLASS IX)

This class shall consist of milled rice which contains not more than 25 per cent of whole kernels, not more than 50 per cent of broken kernels which will pass readily through a $6\frac{1}{2}$ sieve, and not more than 10 per cent of broken kernels which will pass readily through a No. 6 sieve.

Grade requirements for the class *Second Head Milled Rice*

Grade	Maximum limits of—					
	Cereal grains, seeds, and heat damage (number in 500 grams)		Red rice and damage other than heat (singly or combined)	Chalky kernels	Broken kernels	
	Total	Heat damage and seeds (singly or combined)			Through No. 6 sieve	Through No. 6½ sieve
	No.	No.	P. ct.	P. ct.	P. ct.	P. ct.
Extra Fancy (U. S. No. 1) —	20	15	1	3	3	15
Fancy (U. S. No. 2) —	25	20	2	5	5	25
Extra Choice (U. S. No. 3) —	40	35	4	10	7	35
Choice (U. S. No. 4) —	60	50	6	15	10	50
Medium (U. S. No. 5) —	110	100	10	20	10	50

Sample grade: Sample grade shall be milled rice of the class Second Head which does not come within the requirements of any of the grade from Extra Fancy (U. S. No. 1) to Medium (U. S. No. 5), inclusive, or which has any commercially objectionable foreign odor, or is musty or sour, or is heating, or hot, or is of a badly damaged or extremely red appearance, or is otherwise of distinctly low quality, or contains more than 0.1 per cent of foreign material, excepting paddy grains, other cereal grains, and seeds.

The percentage of moisture in grades Extra Fancy (U. S. No. 1), Fancy (U. S. No. 2), Extra Choice (U. S. No. 3), Choice (U. S. No. 4), and Medium (U. S. No. 5) shall not exceed 14.5.

Color and general appearance.—Rice of the grades Extra Fancy (U. S. No. 1), Fancy (U. S. No. 2), and Extra Choice (U. S. No. 3) shall be white, creamy, or grayish. Rice of the grades Choice (U. S. No. 4) may be of slightly damaged or slightly rosy appearance. Rice of the grade Medium (U. S. No. 5) may be of slightly damaged or red appearance.

SCREENINGS MILLED RICE (CLASS X)

This class shall consist of milled rice which contains not more than 25 per cent of whole kernels, which does not meet the requirements of size separations specified for the class Second Head Milled Rice, and which contains not more than 15 per cent of broken kernels which will pass readily through a No. 5½ sieve. This class shall be divided into two subclasses: (a) Screenings Milled Rice and (b) California Japan Screenings Milled Rice.

SUBCLASS (A) SCREENINGS MILLED RICE

This subclass shall include all screenings milled rice possessing the characteristics of rice of this class as grown east of the Rocky Mountains.

*Grade requirements for the subclass Screenings
Milled Rice*

Grade	Maximum limits of—			
	Cereal grains and seeds (number in 500 grams)	Chalky kernels	Broken kernels	
			Through No. 5½ sieve	Through No. 6 sieve
	<i>Number</i>	<i>Per cent</i>	<i>Per cent</i>	<i>Per cent</i>
Extra Fancy (U. S. No. 1)	20	5	4	20
Fancy (U. S. No. 2)-----	50	8	6	30
Extra Choice (U. S. No. 3)-----	90	12	8	40
Choice (U. S. No. 4)-----	140	20	10	50
Medium (U. S. No. 5)---	250	30	15	60

Sample grade: Sample grade shall be milled rice of the subclass Screenings Milled Rice which does not come within the requirements of any of the grades from Extra Fancy (U. S. No. 1) to Medium (U. S. No. 5), inclusive, or which has any commercially objectionable foreign odor, or is musty, or sour, or is heating, or hot, or is of a badly damaged or extremely red appearance, or is otherwise of distinctly low quality, or contains more than 0.1 per cent of foreign material excepting paddy grains, other cereal grains, and seeds.

The percentage of moisture in grades Extra Fancy (U. S. No. 1), Fancy (U. S. No. 2), Extra Choice (U. S. No. 3), Choice (U. S. No. 4), and Medium (U. S. No. 5) shall not exceed 14.5

Color and general appearance.—Rice of the grades Extra Fancy (U. S. No. 1) and Fancy (U. S. No. 2) shall be white, creamy, or grayish. Rice of the grade Extra Choice (U. S. No. 3) shall be white, creamy, or grayish, and may be slightly rosy. Rice of the grade Choice (U. S. No. 4) may be of slightly damaged or rosy appearance. Rice of the grade Medium (U. S. No. 5) may be of damaged or red appearance.

NOTE.—The grade term Medium (U. S. No. 5) for the subclass Screenings Milled Rice corresponds to the grade term “F. A. Q. Screenings” heretofore commonly used commercially.

**SUBCLASS (B) CALIFORNIA JAPAN SCREENINGS
MILLED RICE**

This subclass shall include all screenings milled rice made from the rice known commercially as Japan possessing the characteristics of rice of this class as grown west of the Great Plains area of the United States.

Grade requirements for the subclass California-Japan Screenings Milled Rice

Grade	Maximum limits of—			
	Cereal grains and seeds (number in 500 grams)	Chalky kernels	Broken kernels	
			Through No. 5½ sieve	Through No. 6 sieve
	<i>Number</i>	<i>Per cent</i>	<i>Per cent</i>	<i>Per cent</i>
Extra Fancy (U. S. No. 1)-----	30	5	4	20
Fancy (U. S. No. 2)-----	75	8	6	30
Extra Choice (U. S. No. 3)-----	125	12	8	40
Choice (U. S. No. 4)-----	175	20	10	50
Medium (U. S. No. 5)-----	250	20	10	50

Sample grade: Sample grade shall be milled rice of the subclass California Japan Screenings Milled Rice which does not come within the requirements of any of the grades from Extra Fancy (U. S. No. 1) to Medium (U. S. No. 5), inclusive, or which has any commercially objectionable foreign odor, or is musty, or sour, or is heating, or hot, or is of a badly damaged or extremely red appearance, or is otherwise of distinctly low quality, or contains more than 0.1 per cent of foreign material, excepting paddy grains, other cereal grains, and seeds.

The percentage of moisture in grades extra Fancy (U. S. No. 1), Fancy (U. S. No. 2), Extra Choice (U. S. No. 3), Choice (U. S. No. 4), and Medium (U. S. No. 5) shall not exceed 14.5.

Color and general appearance.—Rice of the grades Extra Fancy (U. S. No. 1), Fancy (U. S. No. 2), Extra Choice (U. S. No. 3), and Choice (U. S. No. 4) shall be white, creamy, or grayish. Rice of the grade Medium (U. S. No. 5) may be slightly damaged or slightly rosy.

BREWERS MILLED RICE (CLASS XI)

This class shall consist of milled rice which contains not more than 25 per cent of whole kernels and contains more than 15 per cent of broken kernels which will pass readily through a No. 5½ sieve. This class shall be divided into two subclasses: (a) Brewers Milled Rice and (b) California Japan Brewers Milled Rice.

SUBCLASS (A) BREWERS MILLED RICE

This subclass shall include all brewers milled rice possessing the characteristics of rice of this class as grown east of the Rocky Mountains.

Grade requirements for the subclass Brewers Milled Rice

Grade	Cereal grains and seeds (maximum limits)		Color and general appearance
	Number in 500 grams	Percentage	
Extra Fancy (U. S. No. 1).	<i>Number</i> 60	<i>Per cent</i> -----	White, creamy, or grayish.
Fancy (U. S. No. 2).	-----	0.1	Do.
Extra Choice (U. S. No. 3).	-----	0.2	White, creamy, or grayish, and may be slightly rosy.
Choice (U. S. No. 4).	-----	0.4	May be of slightly damaged or rosy appearance.
Medium (U. S. No. 5).	-----	1.5	May be of damaged or red appearance.

Sample grade: Sample grade shall be milled rice of the subclass Brewers Milled Rice which does not come within the requirements of any of the grades from Extra Fancy (U. S. No. 1) to Medium (U. S. No. 5), inclusive, or which has any commercially objectionable foreign odor, or is musty, or sour, or heating, or hot, or is of a badly damaged or extremely red appearance, or is otherwise of distinctly low quality, or contains more than 0.1 per cent of foreign material excepting paddy grains, other cereal grains, and seeds.

The percentage of moisture in grades Extra Fancy (U. S. No. 1), Fancy (U. S. No. 2), Extra Choice (U. S. No. 3), Choice (U. S. No. 4), and Medium (U. S. No. 5) shall not exceed 14.5.

NOTE.—The grade term Medium (U. S. No. 5) for the subclass Brewers Milled Rice corresponds to the grade term "Standard Milled Run Brewers" heretofore commonly used commercially.

**SUBCLASS (B) CALIFORNIA JAPAN BREWERS
MILLED RICE**

This subclass shall include all brewers milled rice made from the rices known commercially as Japan possessing the characteristics of rice of this class as grown west of the Great Plains area of the United States.

*Grade requirements for the subclass California
Japan Brewers Milled Rice*

Grade	Cereal grains and seeds (maximum limits)	Color and general appearance
Extra Fancy (U. S. No. 1)-----	<i>Per cent</i> 0.5	White, creamy, or grayish.
Fancy (U. S. No. 2)---	1.0	Do.
Extra Choice (U. S. No. 3)	1.5	Do.
Choice (U. S. No. 4)--	3.0	May be slightly damaged or slightly rosy.
Medium (U. S. No. 5)-	5.0	May be damaged or rosy.

Sample grade: Sample grade shall be milled rice of the subclass California Japan Brewers Milled Rice which does not come within the requirements of any of the grades from Extra Fancy (U. S. No. 1) to Medium (U. S. No. 5), inclusive, or which has any commercially objectionable foreign odor, or is musty, or sour, or is heating, or hot, or is of a badly damaged or extremely red appearance, or is otherwise of distinctly low quality, or contains more than 0.1 per cent of foreign material excepting paddy grains, other cereal grains, and seeds.

The percentage of moisture in grades Extra Fancy (U. S. No. 1), Fancy (U. S. No. 2), Extra Choice (U. S. No. 3), Choice (U. S. No. 4), and Medium (U. S. No. 5) shall not exceed 14.5.

GRADES FOR MIXED MILLED RICE

Mixed milled rice.—Mixed milled rice shall be a mixture of any two or more of Classes I, II, III, IV, V, VI, VII, and VIII, which does not meet the requirements of any one of such classes.

Mixed milled rice shall be graded according to each of the grade requirements common to the class or subclass of the milled rice which predominates over each other class or subclass in the mixture, except that all of the grade requirements in any class as to the maximum percentages of other rices shall be disregarded. The grade designation of mixed milled rice shall include, successively, in the order named, the name of the grade, or the number thereof, the word "Mixed," and, in the order of its predominance, the name and approximate percentage of each class or subclass of milled rice which constitutes 10 per cent or more of the mixture; but if only one class or subclass exceeds 10 per cent of the mixture, the name and approximate percentage of that class or subclass shall be added to the grade designation, followed by the name and approximate percentage of at least one other class or subclass.

GRADES FOR COATED MILLED RICE

Coated milled rice.—Coated milled rice shall be milled rice which has been coated with glucose and talc or any other substance.

Coated milled rice shall be graded and designated according to the grade requirements of the grades applicable to such rice if it were not coated, and there shall be added to and made a part of such grade designation the word "Coated."

GRADES FOR WEEVILY MILLED RICE

Weevily milled rice.—Weevily milled rice shall be milled rice in which adult live weevils or other insects injurious to stored rice, or their larvæ, or clusters of webby material are found in a number exceeding 1 in 500 grams of milled rice.

Weevily milled rice shall be graded and designated according to the grade requirements of the grades applicable to such rice if it were not weevily, and there shall be added to and made a part of such grade designation the word "Weevily."

DEFINITIONS

Basis of determinations.—Each determination of cereal grains, seeds, or other foreign material, heat-damaged kernels, temperature, odor, live weevils, or other insects injurious to stored rice, moisture content, and general appearance shall be made on the basis of the grain including foreign material. All other determinations shall be made on the basis of the grain when free from foreign material.

Percentages.—Percentages, except in the case of moisture, shall be percentages ascertained by weight.

Percentage of moisture.—Percentage of moisture shall be that ascertained by the moisture tester and the method of use thereof described in Bulletin 1375, dated February, 1926, issued by the United States Department of Agriculture, Bureau of Agricultural Economics, or ascertained by any device and method giving equivalent results.

No. 5½ sieve.—A metal sieve perforated with round holes five and one-half sixty-fourths inch in diameter.

No. 6 sieve.—A metal sieve perforated with round holes six sixty-fourths inch in diameter.

No. 6½ sieve.—A metal sieve perforated with round holes six and one-half sixty-fourths inch in diameter.

Damaged kernels.—Damaged kernels shall be kernels and pieces of kernels of milled rice which

have been distinctly damaged by water, insects, or by any other means. Sound double and sound broken kernels shall not be considered damaged kernels.

Heat-damaged kernels.—Heat-damaged kernels shall be kernels and pieces of kernels of milled rice which have been distinctly discolored by external heat or as a result of heating caused by fermentation.

Cereal grains.—Cereal grains shall include paddy grains (rough rice), barley, wheat, rye, emmer, spelt, einkorn, corn, grain sorghums, and oats, and shall not include buckwheat, flaxseed, and wild oats.

Seeds.—Seeds shall be grains, kernels, or seeds, either whole or broken, of any plant other than rice or cereal grains.

Red rice.—Red rice shall be kernels or pieces of kernels of milled rice which are distinctly red in color or have any appreciable amount of red bran thereon.

Broken kernels.—Broken kernels shall be split kernels of milled rice and pieces of kernels which are less than three-fourths of the length of the perfect kernel.

Chalky kernels.—Chalky kernels shall be kernels and pieces of kernels of milled rice one-half or more of which is chalky.

THE SAMPLING OF MILLED RICE

The obtaining of a representative sample is essential to the determination of the true grade of a given lot of milled rice. If the sample obtained is not representative, no amount of care in making determinations for the grading factors will establish the true grade of the milled rice sampled. Consequently great care should be taken in sampling in order that the sample on which the grade of the milled rice is to be based shall truly represent the milled rice sampled.

Samples drawn from individual sacks should either be kept in separate containers until taken to the inspection office or should be compared by the sampler as drawn to see that the lot being sampled is uniform and regular in quality.

The sample should be approximately 2 quarts in size. If the time to elapse between the drawing of the sample and the determination of grade would permit of such change in the condition of the sample as to affect the grade, at least $1\frac{1}{8}$ pints should be inclosed in an air-tight container and the remainder, if any, in a clean cloth sack.

Samples should be drawn from as many individual sacks selected at random as will enable the sampler to procure an average and representative sample of the entire lot. In no case should fewer than 10 per cent of the sacks in a lot be probed to obtain a representative sample.

In case a lot of rice is of such size or is stacked in such a manner that a representative sample

can not be obtained, no official inspection of the rice should be made until a representative portion of it is accessible for sampling.

In case it shall appear that a material portion of a lot or parcel of rice is in any manner distinctly inferior to the remainder of the lot or parcel, a separate sample otherwise complying with these instructions shall be taken from such portion and from the remaining portion. There shall be filed with such sample a statement showing the estimated quantity of each portion of the rice from which each sample was taken.

MILLED RICE TRIER

For obtaining a representative sample from sacked milled rice the use of the trier shown in Figure 1 is recommended.

The use of such a trier makes it possible for the sampler to note the condition of rice in the centers of the sacks. To obtain a sample from the center of the pocket the core is inserted in the trier, the trier is pushed into the sack, the core is removed, and the trier is allowed to fill with rice.

When the rice in a sack is uniformly dry and of good quality it is not so necessary to examine the center of the pocket but if the rice has been excessively damp it is highly essential that the quality of the rice in the center of the pocket be determined before placing a grade on the lot.

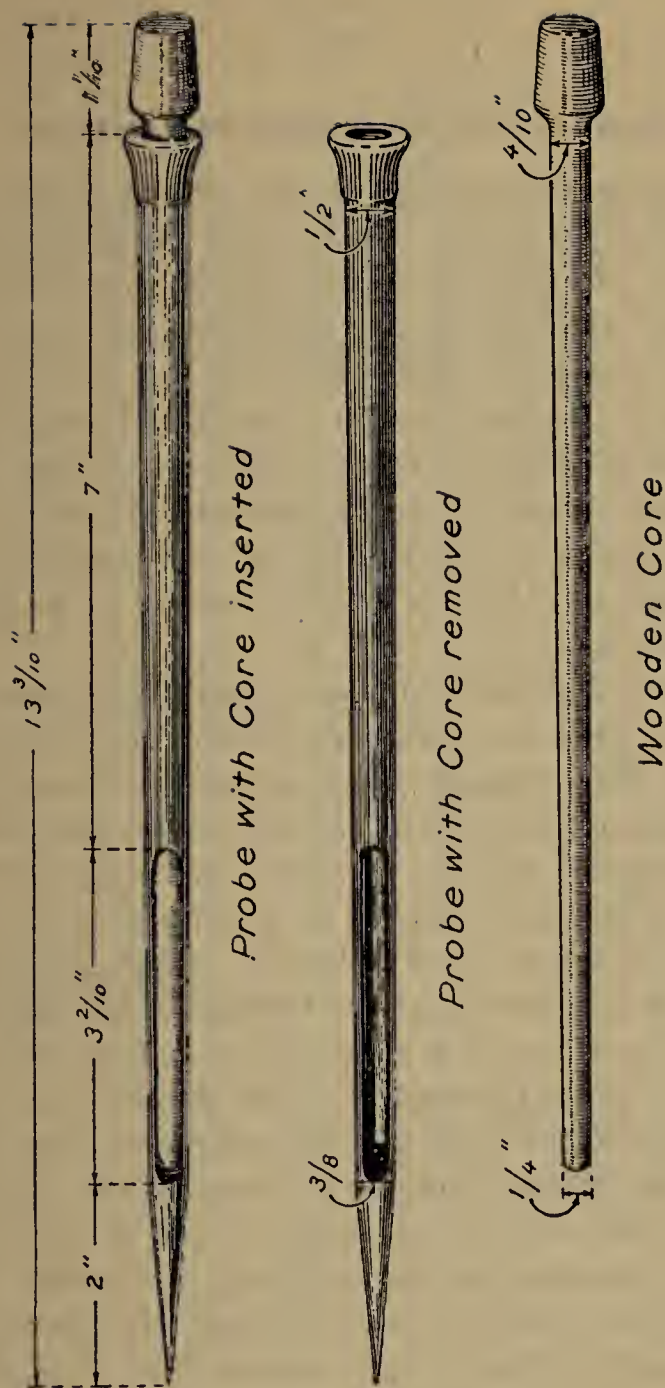


FIG. 1.—Milled rice sack trier (probe). Used for obtaining a representative sample from sacks (pockets) of milled rice

SAMPLE DIVIDER (BOERNER SAMPLER)

After a representative sample of the lot or parcel of rice to be graded is obtained, it is usually necessary to reduce its size considerably, in order that the grade may be determined by careful analysis. To reduce the size of a sample of rice containing broken kernels or foreign substances of different specific gravity or size than of the rice with which they are mixed, and at the same time obtain a sample as representative as the original, is hardly possible except by mechanical means.

Figure 2 shows a device, generally referred to as the "Boerner sampler," which will divide a sample into smaller portions and still maintain the proper proportions for the various factors of the original sample. In the operation of this device the rice is placed in a hopper at the top of the machine and released, when it passes through an opening at the bottom of the hopper, down the sides of a cone, the point of which is directly under the center of the opening. Around the base of the cone are 36 pockets or openings. The rice falling down the sides of the cone is cut into 36 separate streams, which, a little farther on, merge into two streams. Streams Nos. 1, 3, 5, etc., unite into one stream which empties into one receptacle, and streams Nos. 2, 4, 6, 8, etc., unite into another stream which empties into a second receptacle.

This device and a simplified form of it are fully described in United States Department of Agriculture Bulletins Nos. 287 and 857.

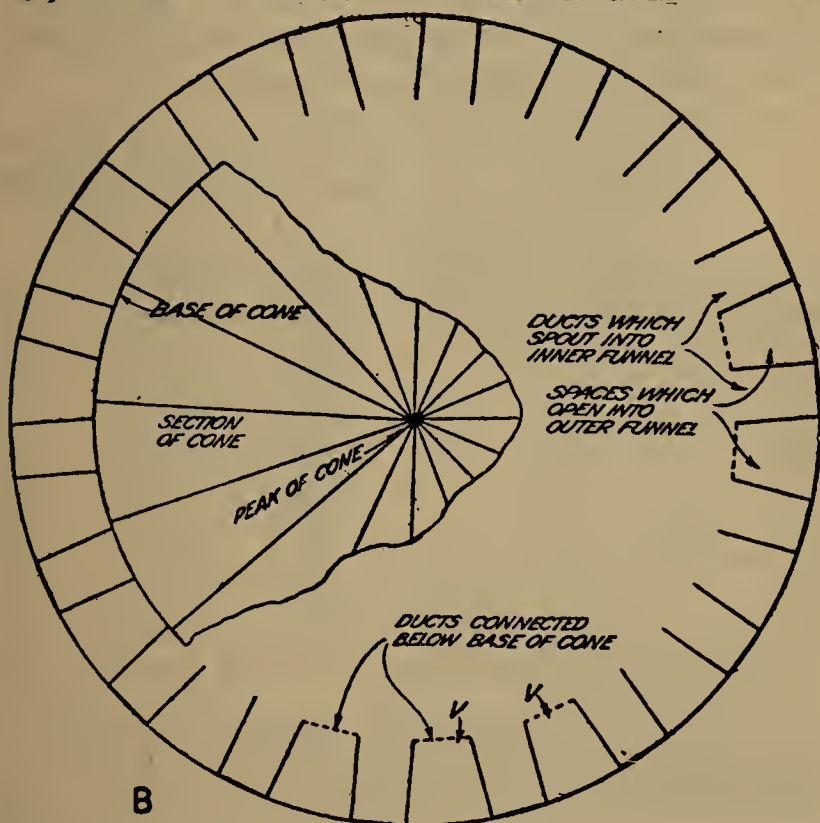
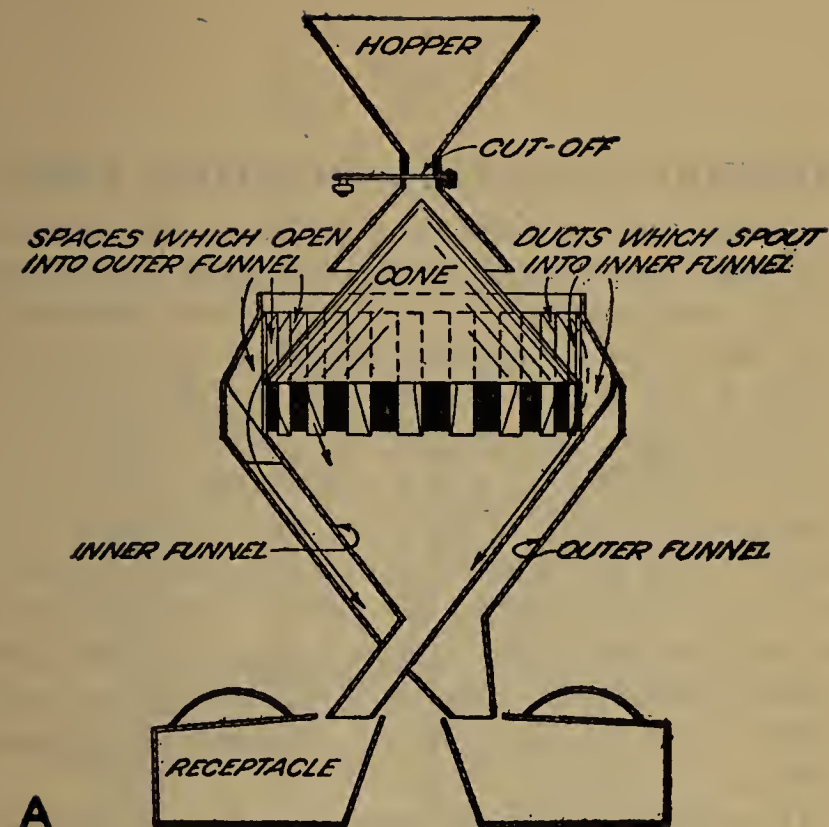


FIG. 2.—Sample divider (Boerner sampler). A, vertical cross section of device showing paths taken by the material in passing from the hopper to the containers; B, cross section of the device at the base of the cone

METHOD OF MAKING MOISTURE TESTS

Owing to the numerous methods of making moisture determinations and the wide variations in the results obtained by the different methods, the tester and method described in Bulletin 1375 of the Bureau of Agricultural Economics, United States Department of Agriculture, have been designated as the standard on which the grades are based. This in no way precludes the use of other methods of making moisture determinations, so long as the results are corrected to conform to those secured by the standard method specified. Figure 3 represents a sectional view of the official standard moisture tester.

In making moisture tests, use the quantities of oil and grain and extinguish the flame as listed in the following table of specifications:

Kind of grain	Oil in flask	Weight of grain in flask	Extinguish the flame at—
	<i>C. c.</i>	<i>Grams</i>	<i>C.</i>
Head rice (milled)-----	¹ 150	100	200
Second head rice-----	¹ 150	100	200
Screenings rice-----	² 150	100	200
Brewers' rice-----	² 150	100	200
Brown rice-----	¹ 150	100	200
Rough rice-----	150	100	200
Wheat-----	150	100	180
Shelled corn-----	150	100	190
Oats-----	150	³ 50	195
Rye-----	150	100	175
Grain sorghums-----	150	100	190
Barley-----	150	100	190
Flaxseed-----	150	100	175

¹ Use glass wool pad 2 inches in diameter and one-fourth inch thick in bottom of flask.

² Use double-walled flask (Dept. of Agr. Bulletin No. 1375).

³ Use special graduate which is one-half of the volume of the regular graduate; however, the regular graduate may be used by doubling the moisture test reading.

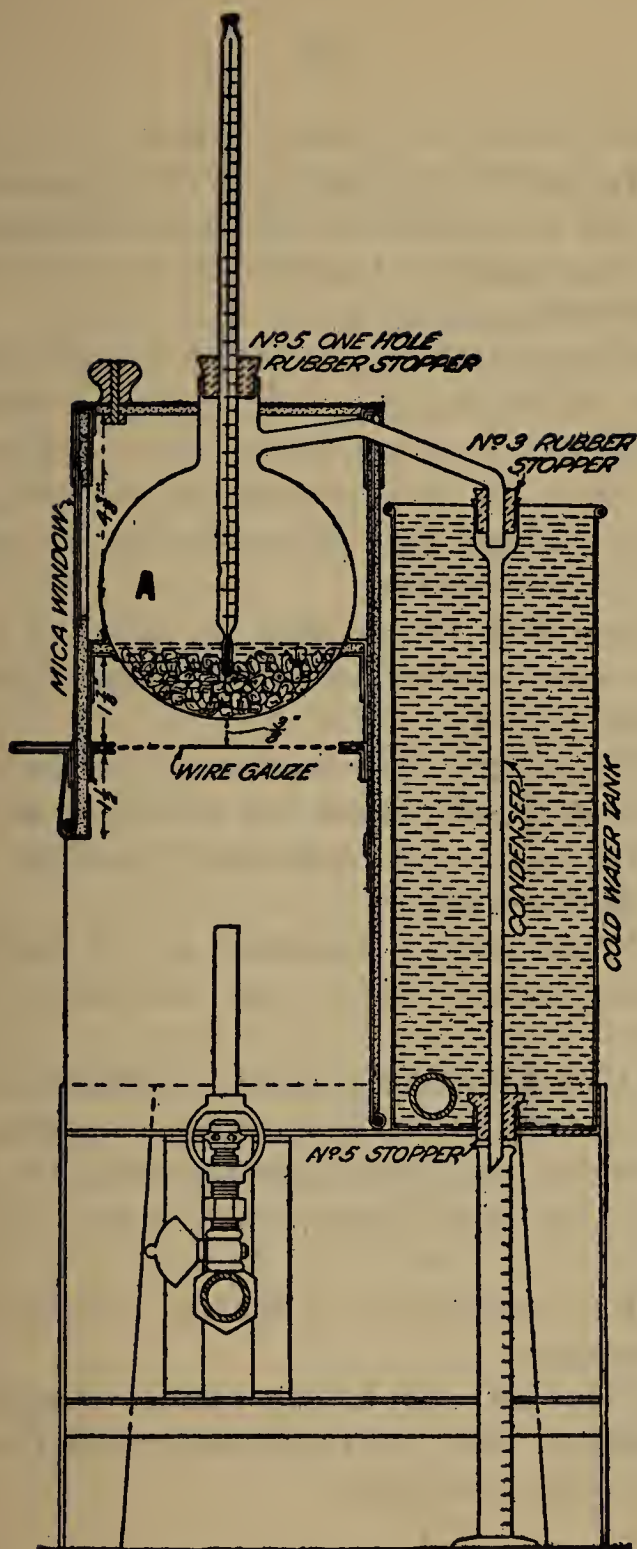


FIG. 3.—Moisture tester. Sectional view of the official moisture tester, showing the various parts properly connected for use; A, distillation flask in position three-eighths of an inch above the wire gauze

Special points for consideration:

(1) Install the moisture tester in a place where it will not be exposed to strong air currents.

(2) The standard tester is equipped for heating with illuminating gas.

(3) Keep the wire gauze with asbestos center in good condition and so adjusted that the flame plays directly in the center of the asbestos.

(4) Place the flask so that the bottom of the flask is not less than three-eighths of an inch above the wire gauze.

(5) See that the column of mercury in the thermometer is continuous; if broken it should be shaken down.

(6) Thoroughly mix the sample before weighing for tests; and unless the test is to be made immediately upon its arrival in the office, place in air-tight container.

(7) Make tests in duplicate, and if duplicates vary over three-tenths of 1 per cent make another test.

(8) Adjust the thermometers so that four-fifths of the mercury bulb is submerged in the grain and oil after the grain has been placed in the flask. (See to the adjustment each time. Do not guess.)

(9) Use correctly graduated thermometers and graduates.

(10) Do not use mushy rubber stoppers as they absorb some of the moisture that should pass into the graduates.

(11) Clean and dry each graduate before using for a test. (Do not let them show any moisture in the bottom or along the sides.)

(12) Do not use oil directly from the previous test. Empty used flasks into a large storage can and never directly into the oil-measuring device.

(13) Keep a good circulation of cold water through the condenser tank.

(14) Adjust the heating apparatus so that the required temperature is reached in 20 minutes. A longer time will give results too low and a shorter time, too high.

(15) If the moisture content of the sample is high so that there is a tendency to boil over, lower the flame until a considerable portion of the water is distilled over.

(16) Cut off the heat at the exact temperature prescribed for each grain.

(17) After the flame is extinguished a slight gradual rise in temperature is to be expected. A sudden increase or sudden decrease in temperature of several degrees indicates that the flame was too intense during the latter part of the heating, and the test should be repeated.

(18) Do not remove covers, nor remove thermometers, until the temperature recedes to 160° C.

(19) After the temperature has fallen to 160° C. or lower disconnect thermometer and then the delivery tube.

(20) Read the percentage of moisture in the graduated cylinder after all the drops clinging to the sides of the graduates have been shaken down. The reading is taken beneath the layer of oil on top of the water.

(21) Results of tests need not be expressed more closely than one-tenth of 1 per cent.

(22) If the water which distills over is discolored, the substance has evidently been burned and the test should be repeated.

(23) When machine is not in use keep thermometers connected in the flasks and the flasks connected with the distilling tubes in the same manner as for making a test. •

(24) Before making a test in a new flask, or before using a machine that has not been in use for a 24-hour period, a test should be made on a preliminary sample so that all the flasks will be uniform in condition.

(25) Place scales on a firm support and see that they are in balance before making a weighing.

(26) The specific directions given above and in Department of Agriculture Bulletin No. 1375 for making tests do not apply to modified forms of testers.

APPARATUS FOR GRADING MILLED RICE ACCORDING TO THE UNITED STATES GRADES FOR MILLED RICE

For the information of persons who desire to equip laboratories for the grading of milled rice according to the United States grades for milled rice the following equipment is regarded as essential:

1. Brown-Duvel moisture tester, completely equipped with flasks, certified centigrade thermometers to read correctly from 170° to 200° F.; graduates of 25 c. c. capacity; one-hole rubber stoppers, sizes No. 5 and No. 3; condenser tubes; 150 c. c. oil-measuring device; supply of oil, etc. (See U. S. Department of Agriculture Bulletin No. 1375; also fig. 3, p. 31.)

2. Supply of glass wool, of medium fine texture, for use in flasks in making moisture tests.

3. Balance, capacity 1,000 grams, sensitive to one-tenth gram, with set of weights, 1 gram to 1,000 grams. (Desirable, but not essential.)

4. Balance, capacity 500 grams, sensitive to one-tenth gram, with set of weights, 1 gram to 500 grams.

5. Balance, capacity approximately 50 grams, graduated beam to read 1 gram and fractions of a gram, sensitive to one-tenth gram, with set of weights, 1 gram to 50 grams.

6. Sieves and pan for use in determination of percentage of broken kernels:

- (a) Bottom pan: Inside diameter at bottom should be 13 inches, inside diameter at top

should be $13\frac{3}{4}$ inches, depth $2\frac{9}{16}$ inches, and roll at top of pan $\frac{3}{16}$ inch in diameter.

(b) No. $5\frac{1}{2}$ sieve: With round perforations five and one-half sixty-fourths inch in diameter. This sieve should have a depth of $2\frac{5}{16}$ inches and roll at top of sieve three-sixteenths inch in diameter and should be made to nest very freely with bottom pan.

(c) No. 6 sieve: With round perforations six sixty-fourths inch in diameter. This sieve should have a depth of $2\frac{1}{16}$ inches and roll at top of sieve three-sixteenths inch in diameter and should be made to nest very freely with No. $5\frac{1}{2}$ sieve.

(d) No. $6\frac{1}{2}$ sieve: With round perforations six and one-half sixty-fourths inch in diameter. This sieve should have a depth of $1\frac{13}{16}$ inches and roll at top of sieve three-sixteenths inch in diameter and should be made to nest very freely with No. 6 sieve.

7. A device (Boerner sampler) for correctly dividing a sample of rice into smaller portions for analysis and moisture determinations. (See U. S. Department of Agriculture Bulletins Nos. 287 and 857; also figure 2, p. 29.)

8. Milled rice trier with core. (See fig. 1.)

9. Air-tight containers (sample cans), capacity approximately 500 grams.

10. Cloth sample bags, waterproofed; capacity at least 2 quarts.

11. Grain pans, with spout for pouring into other containers.

In addition to the apparatus listed above, the following equipment will be found convenient and desirable:

1. Extra moisture-testing equipments: Flasks, thermometers, graduates, rubber stoppers, test-tube cleaners, etc.

2. Five-gallon oil can equipped with faucet or oil-measuring device.

3. Five-gallon oil can equipped with strainer funnel to recover oil.

4. Five-gallon refuse can with strainer funnel.

5. Small funnel to fit in moisture flasks for pouring sample into flasks.

6. Tweezers for mechanical analysis.

7. Small grain scoop.

8. Brush for cleaning up rice.

9. Heavy table for handling samples, analysis, etc.

10. Furniture, including chairs, stationery supplies, files, etc., to keep proper records.

FURTHER INFORMATION

Organized commercial milled rice inspection departments are located at several important rice markets in the South and in California.

For further information regarding the inspection and grading of milled rice in accordance with the provisions of the United States grades for milled rice apply to any Federal field office of Rice Investigations or to the Bureau of Agricultural Economics, Department of Agriculture, Washington, D. C.

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